Treating Nonpoint Source Pollution in the Mattole River Watershed

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Mattole Restoration Council


Oregon
California
Nevada
199
101
96
299
36
5
1
20
Eureka
Redding
Sacramento
San Francisco
Mattole River watershed
ASBS
MPA
CCA
0
20
40
80 Miles


2006/04/19

Got
Pollution?

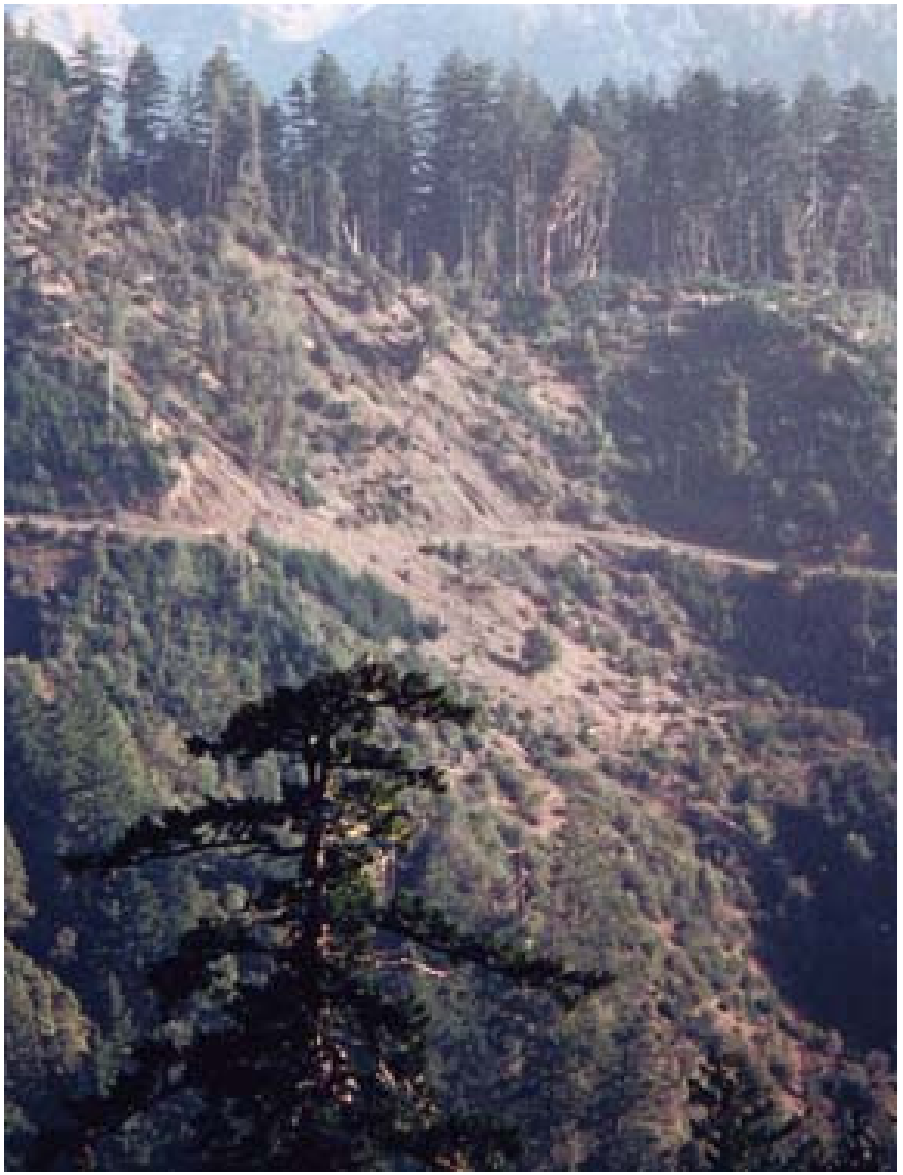
Mattole River Watershed

1942

1965

Impaired Watershed

- The Mattole River and its tributaries are listed as “Impaired” by EPA with two nonpoint source water pollutants:
  - Sediment
  - Temperature
- TMDLs have been developed for both



Sediment and Temperature in the Mattole

- These two pollutants impact multiple Threatened and Endangered species including:
  - Coho Salmon
  - Chinook Salmon
  - Steelhead Trout

Two Pollutants: Two Integrated Solutions

Mattole Restoration Council: one of the nation's oldest community driven watershed organizations.

- Two main ongoing programs for dealing with NPS Pollution:
  - 1. Good Roads, Clear Creeks
    - Direct sediment stabilization projects
  - 2. Riparian Ecosystem Restoration
    - Riparian forestry, increase shade

Good Roads, Clear Creeks Program

Addresses Sediment Pollution on a Basin-wide Scale

- Three Main Project Types:
  - Road Upgrade/Stormproofing
    - Stream crossing upgrades
    - Road reshaping for improved drainage
  - Road Decommissioning
    - Stream crossing excavation
    - Road segment recontouring
  - Streambank Stabilization
    - Bioengineered riprap
    - Channel Realignment

Road Upgrades – Basic Culvert Installation

- Culvert is sized properly and placed deep in the fill.
- Rip rap is placed around the culvert outlet for energy dissipation and fill stabilization
- Fill slope is compacted at a stable angle and mulched

Road Upgrade – Class I Stream Crossing

Crossing upgrades on class I streams have to be completed to fish passage standards. These sites often yield some of the highest sediment pollution reduction.

- Bottomless structures such as a bridge or arch culvert are best in most cases.
- Excavation of 3000 cubic yards of sediment was completed at this site in the Whitethorn Project Area

Road Upgrade – Road Surface Reshaping

These post-project photos show roads reshaped with a rolling dip and crowning.

- Reduce road surface erosion by crowning, out-sloping or dipping the road so water flows off the surface
- All reshaped roads are surfaced with gravel
- Ditch relief culverts or rolling dips disperse inboard water before it can cause erosion

Road Decommissioning – Crossing Excavations

These pre and post project photos taken from the same location demonstrate a typical excavation of a historic logging road

- All sediment was excavated from the channel and stored in a stable location
- Small machinery was used at this site to minimize the footprint of decommissioning work on this park-like setting
- Small boulders and cobble were mined from a rock outcropping nearby and used to armor the newly excavated stream channel

Road Decommissioning – Recontouring

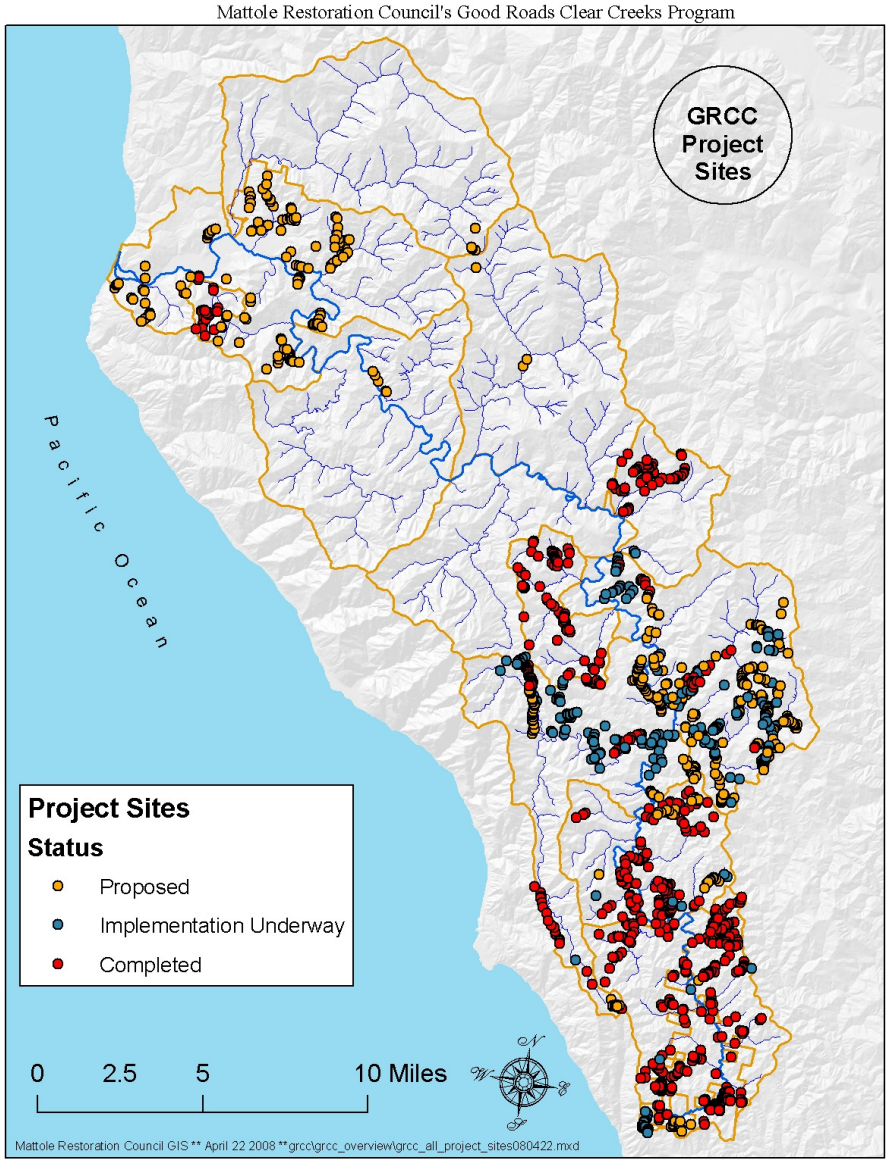
These photos were taken from the same location along a segment of old logging road in the Ancestor Creek watershed near the headwaters of the Mattole River.

- Old logging roads cause sedimentation when water is concentrated on the road surface and erodes gullies
- In addition these old roads are proven to disturb natural groundwater infiltration

Streambank Stabilization – Bioengineered Riprap

Streambank Stabilization – Bioengineered Riprap

Good Roads Clear Creeks Project Site Locations



- Work done between 2002-2007
- Over 600 sites spread across the watershed at various phases of the restoration process

Non Point Source Pollution and Total Maximum Daily Load (TMDL)

- Calculating sediment pollution reduction to reach Water Board TMDL requirements based on table below:

Table 3.2 Natural and Management-Related Sediment Yields in the Mattole Watershed

Sediment Source	Estimated Sediment Delivery (tons/mi^2/yr)				
	North	East	South	West	Entire Watershed
Natural Mass Wasting	3,700	1,600	1,600	2,100	2,400
Stream Bank Erosion	790	270	170	360	460
Natural Erosion Total	4,500	1,900	1,800	2,500	2,900
Road-Related Mass Wasting	2,000	5,900	450	2,100	2,900
Road-Stream Crossing Failures	50	40	160	40	50
Road-Related Gullying	100	190	290	200	170
Road-Related Surface Erosion	360	670	780	560	540
Skid-Trail Related Erosion	590	700	760	850	710
Other Harvest Related Delivery	600	140	150	1500	700
Road Erosion Total	2,500	6,800	1,700	2,900	3,700
Harvest Activity Erosion Total	1,200	840	910	2,400	1,400
Erosion Total for All Sources	8,200	9,500	4,400	7,800	8,000

More Data and Formulas for Determining TMDL Status

- The State Water Board set the Allowable Sediment Loading (ASL) at 125% of Natural Sediment Loading (NSL)

- Assumption: Timeframe of project relevance = 15 years. This is an important factor in TMDL calculations and represents the timeframe over which the sediment reduction obtained through this project should be applied to TMDL standards.

- Assumption: 1 ton = 1 cubic yard

- FINAL FORMULA:
- % Sediment Reduction = $\frac{\text{Project Sediment Savings}}{(\text{ASL-CSL})*(\text{Project Area})*(15 \text{ years})}$

(CSL = Current Sediment Loading from SWRCB Table)

Sediment TMDL Accomplishment by Project Area

Name of Project Area	Project Area (square miles)	Project Sediment Savings (cubic yards)	Allowable Sediment Loading (tons/mile2/year)	Current Sediment Loading (tons/mile2/year)	% TMDL Achieve-ment
Panther Gap and Middle Mattole	14	78200	5000	9500	8.3%
Whitethorn and Bridge to Mill	26	62870	3600	4400	20.2%
Eubanks	16	56345	3600	7200	6.5%
Bear	24	53850	3600	6000	6.2%
Blue to Grindstone	28	226040	5000	9500	12.0%
Mcginnis to Mouth	32	73241	5625	8000	6.4%

- Note: Some of the background data supplying the values for sediment loading are preliminary, but this table gives a sense of MRC accomplishments.

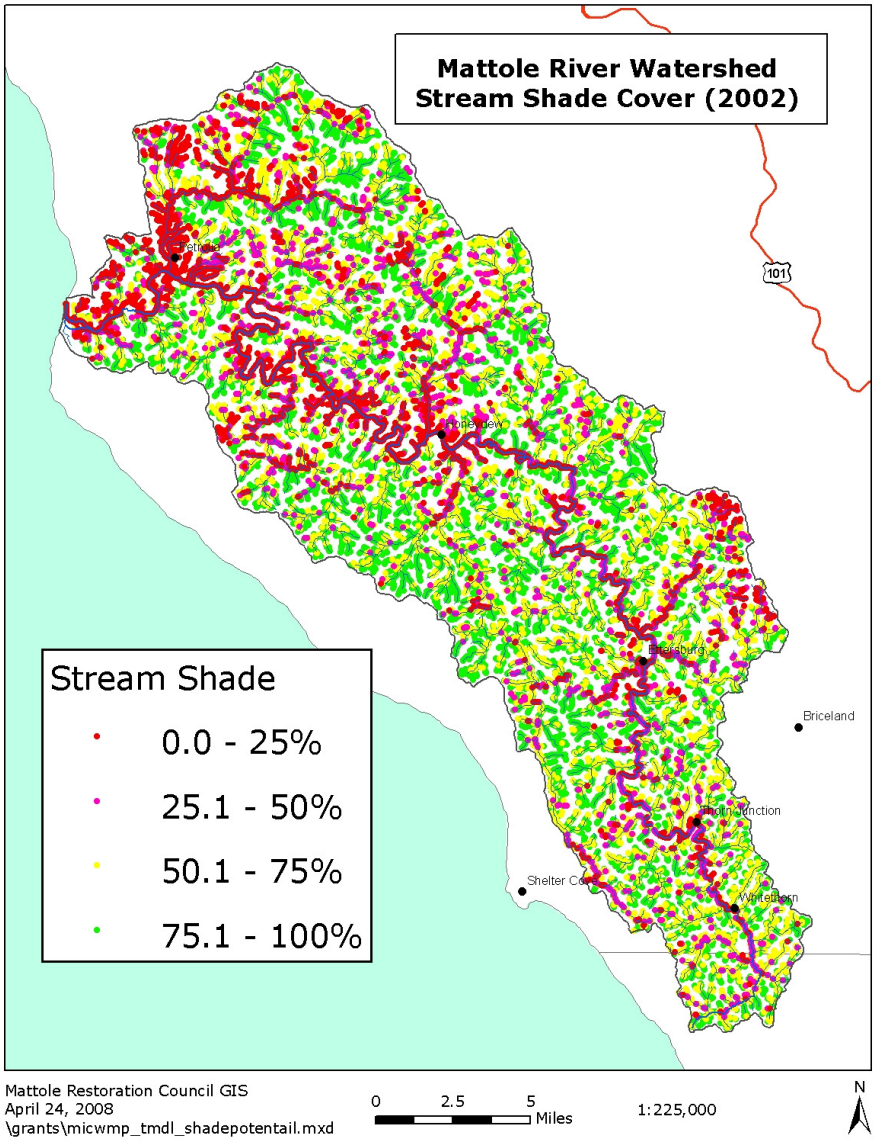
Other factors that reduce NPS sediment pollution within the Mattole Watershed

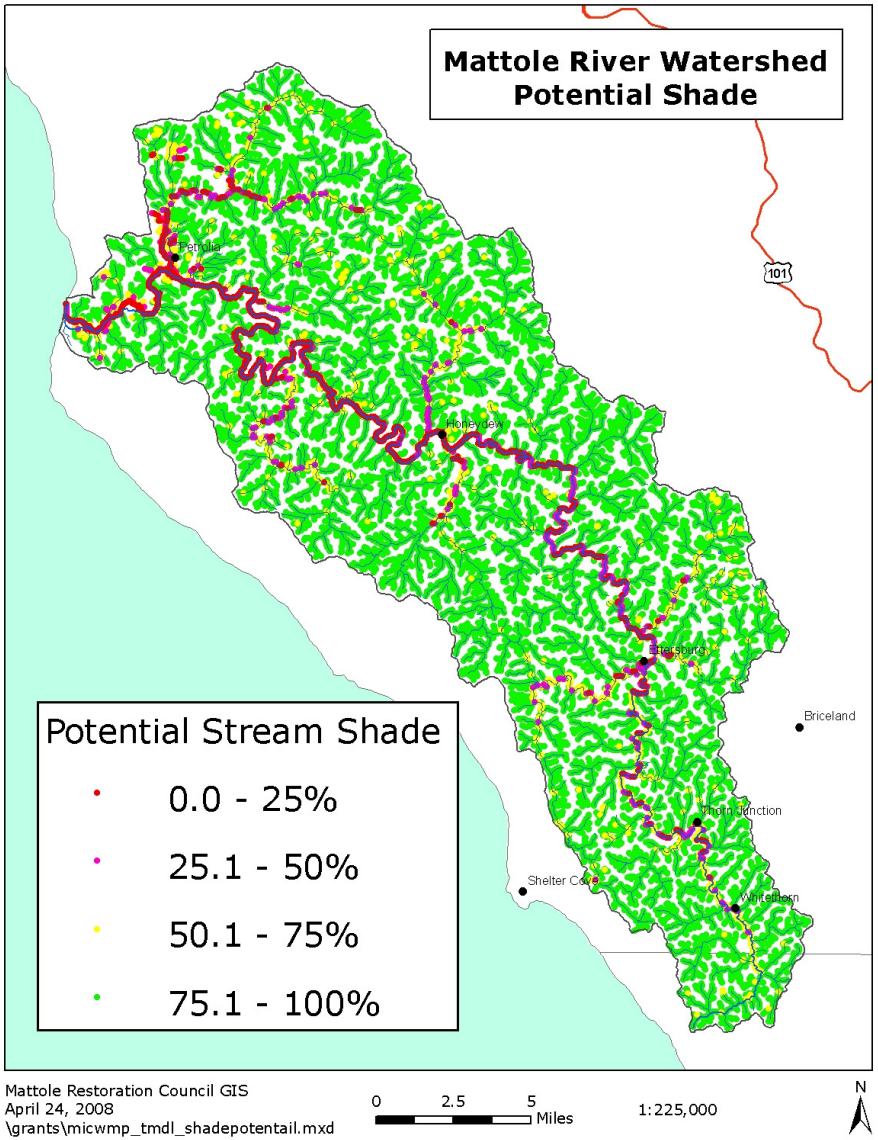
- Other projects performed by other restoration groups, leveraged by MRC funding.
- The reverse-snowball effect of sedimentation where upslope stabilization greatly reduces sediment delivery potential lower in the system.
- Education of local landowners and contractors who will continue to perform Best Management Practices

Riparian Ecosystem Enhancement

Addresses Stream **Temperature Pollution** for the Long Term

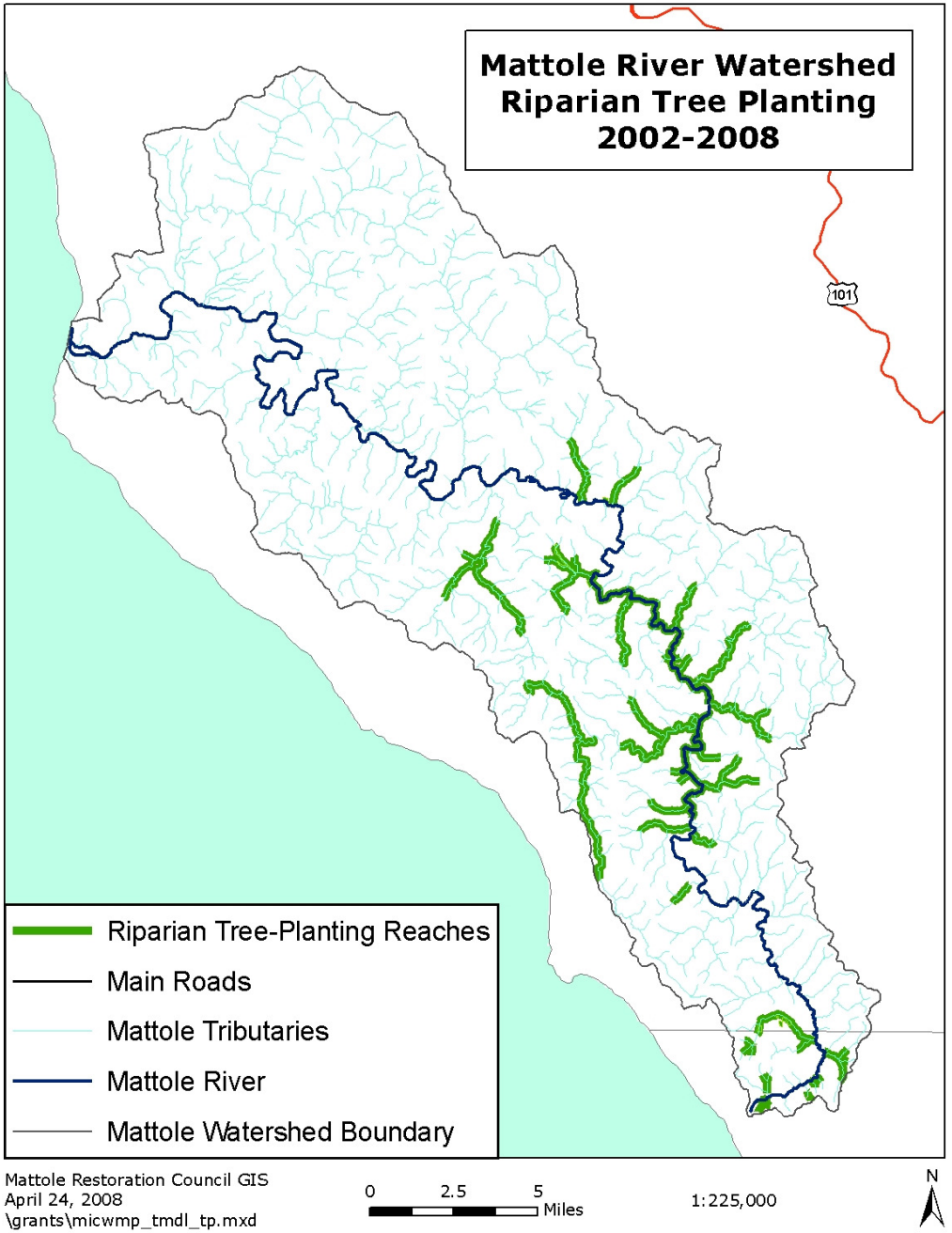
Mattole River Temperature TMDL





Mattole Restoration Council Riparian Tree Planting:

- 150,000 **native fir** along fifty miles of twenty-one tributary creeks and the mainstem Mattole River
- over 3,500 **native redwoods** in targeted sites along eight streams
- over 10,000 **native hardwoods** along nearly five miles of three prioritized streams.

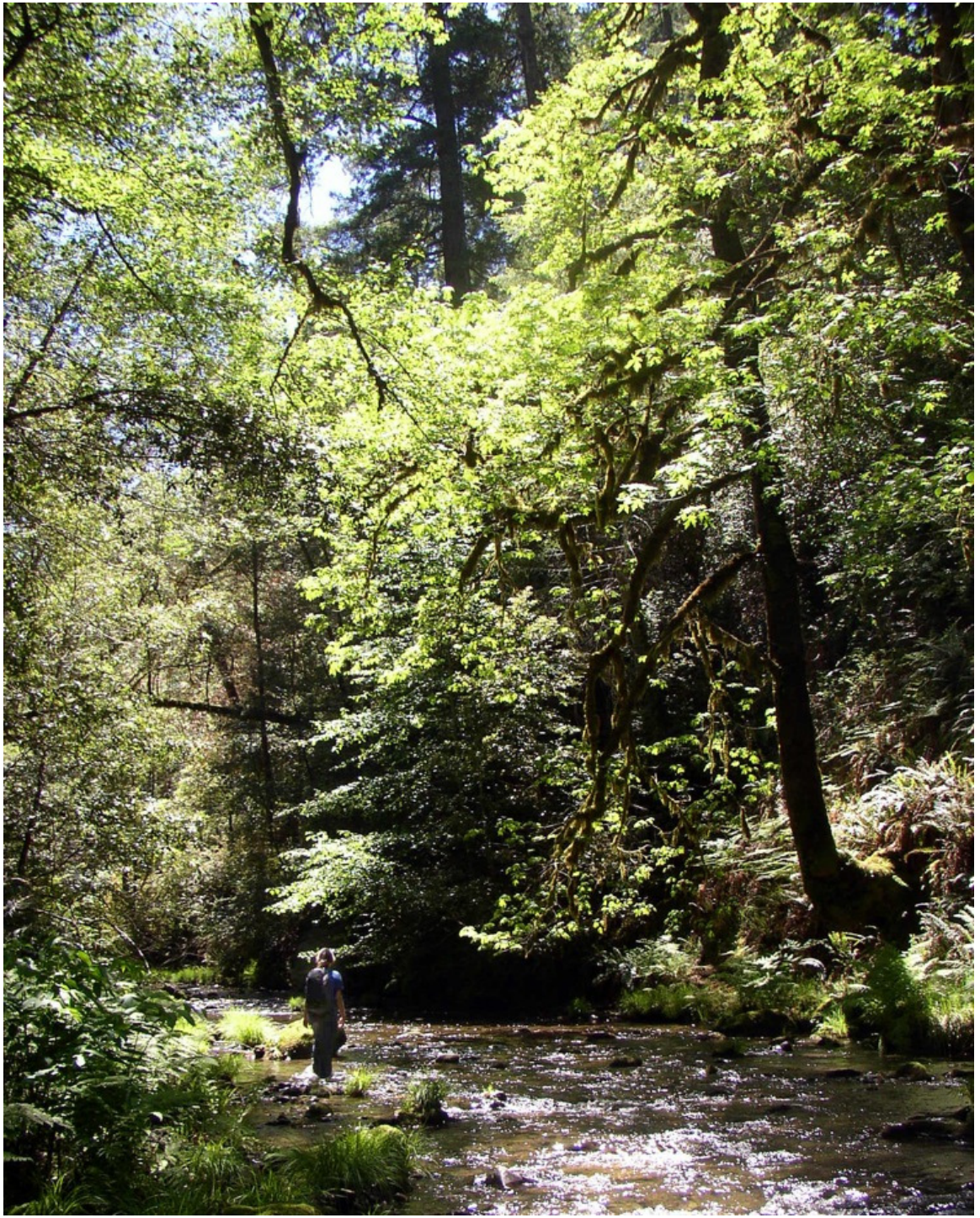


Beyond Treeplanting: A Riparian Ecosystem Restoration Toolbox

- Three main program components:
  - Early-Successional Native-Plants Re-Vegetation
  - Riparian Conifer Enhancement
    - a. Conifer Thinning
    - b. Conifer Release
    - c. Hardwood-Stand Conversion to Conifer
  - Post-Thinning Instream Wood Structures

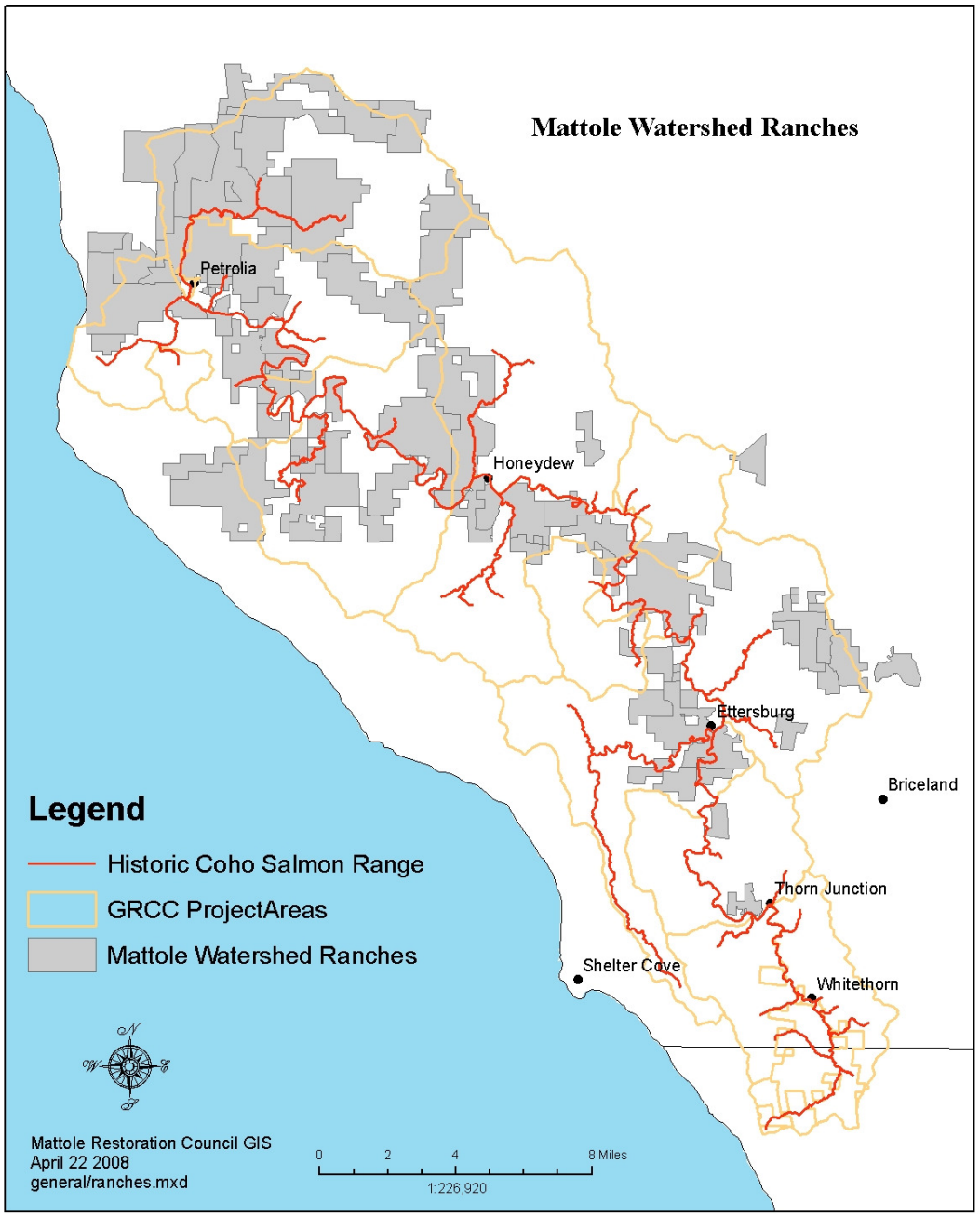
The Goal:

Dense, multi-story canopy providing deep shade, keeping streams cool



Solutions

- Develop collaborative partnerships; focus on how projects can serve landowners
- Alphabet Soup
  - IWMP
  - IRWMP
  - ICWMP
  - 319h NPS
- Work on multiple, integrated fronts; education is essential.



Next Steps

- Updated Watershed Plan, using the Integrated Coastal Watershed Management model
- Outreach to ranchland owners, demonstrating that TMDL implementations can also mean improvements to ranchland infrastructure
- Expanded monitoring programs to further demonstrate results

Mattole River Estuary

Conclusion

- Work described here is part of a larger, holistic, comprehensive watershed restoration program
- Building community support though cooperative approaches has been highly effective
- Full recovery will take decades; we are planning for the long term

www.mattole.org

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